

(12) UK Patent Application (19) GB (11) 2 384 389 (13) A

(43) Date of A Publication 23.07.2003

(21) Application No 0309965.2

(22) Date of Filing 17.04.2000

Date Lodged 30.04.2003

(30) Priority Data

(31) 11116868 (32) 23.04.1999 (33) JP

(62) Divided from Application No

0009472.2 under Section 15(4) of the Patents Act 1977

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(51) INT CL⁷

H04M 1/02

(52) UK CL (Edition V)

H4J JK J36Q

(56) Documents Cited

GB 2235850 A WO 1999/012322 A1

(58) Field of Search

UK CL (Edition V) H4J

INT CL⁷ H04M

Other: WPI, EPODOC, JAPIO

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(54) Abstract Title

Sliding cover having openings aligned with microphone in mobile phone housing

(57) A portable radio device (eg mobile phone) has a main housing 1 having a keypad 2 and a microphone 3. A first opening 6a formed in a slidable cover 4 aligns with the microphone when the cover is closed (keypad covered), and a second opening 6b aligns with the microphone when the cover is open (keypad exposed). Thus the microphone can function, and a user can make a call, whether the cover is open or closed. Ribs are formed around the openings in the cover and/or the microphone in the housing to prevent noise leakage.

FIG.1B

FIG.1A

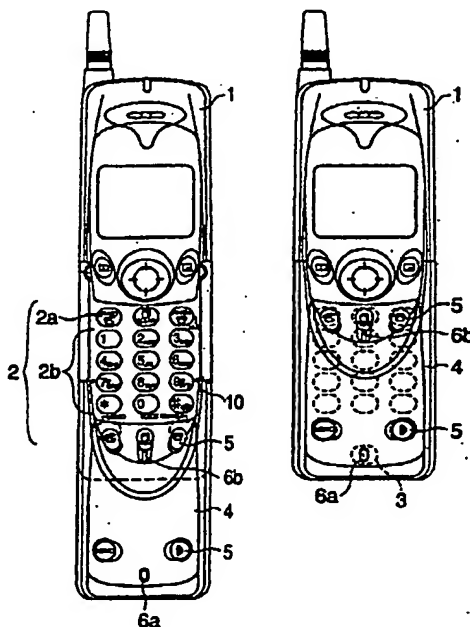


FIG.1C

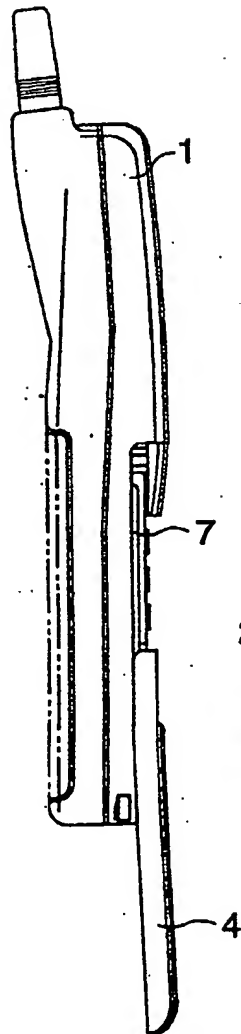


FIG.1B

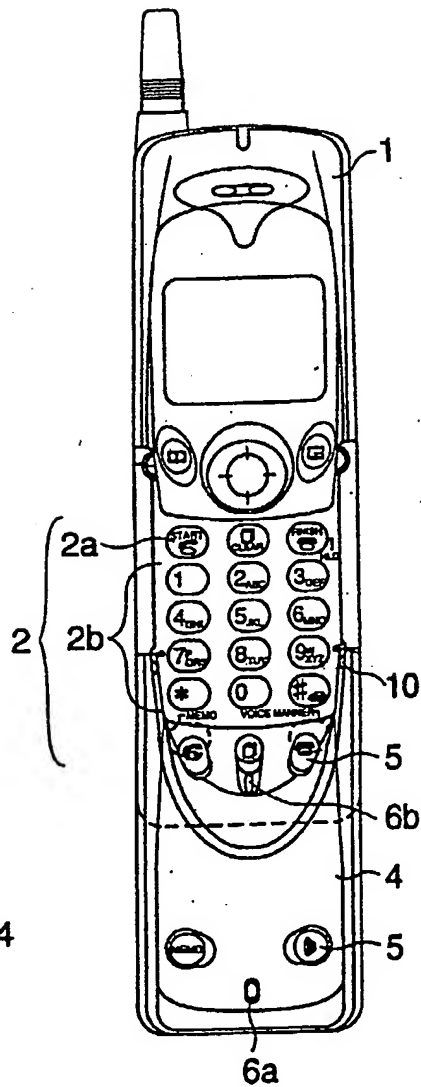
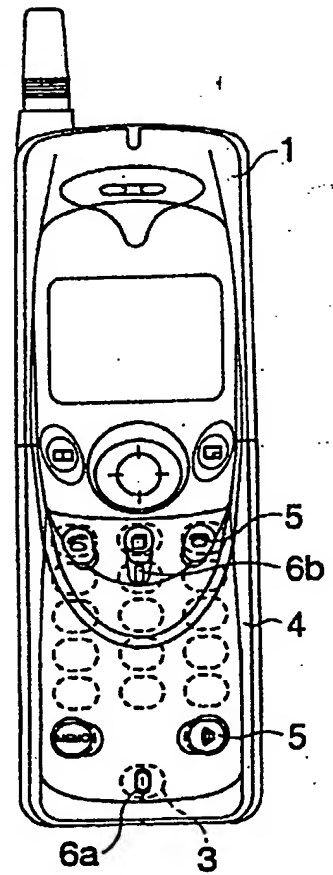


FIG.1A



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FIG.2A

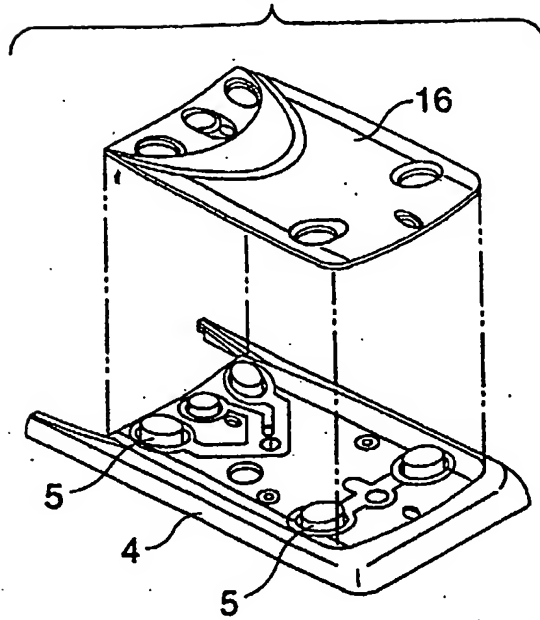
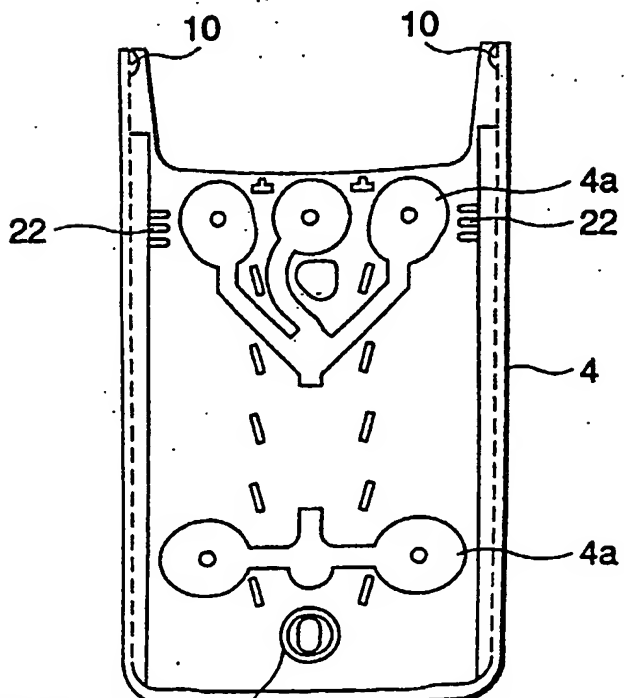


FIG.2B



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FIG.3A

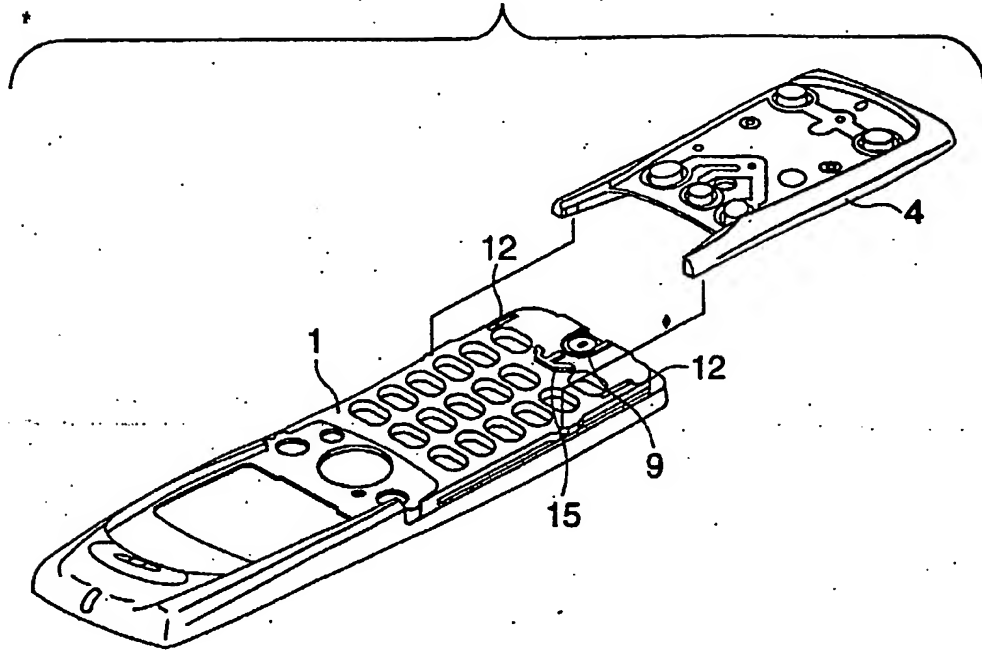


FIG.3B

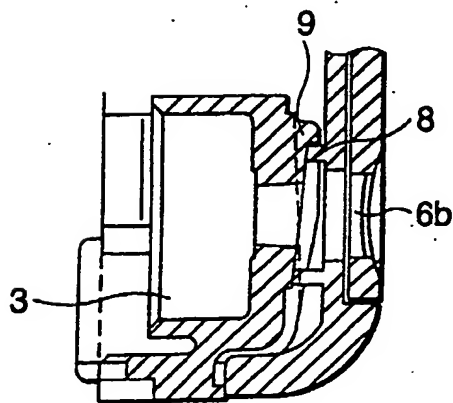
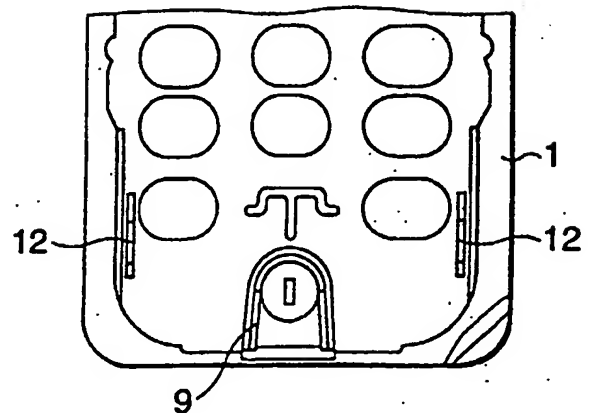
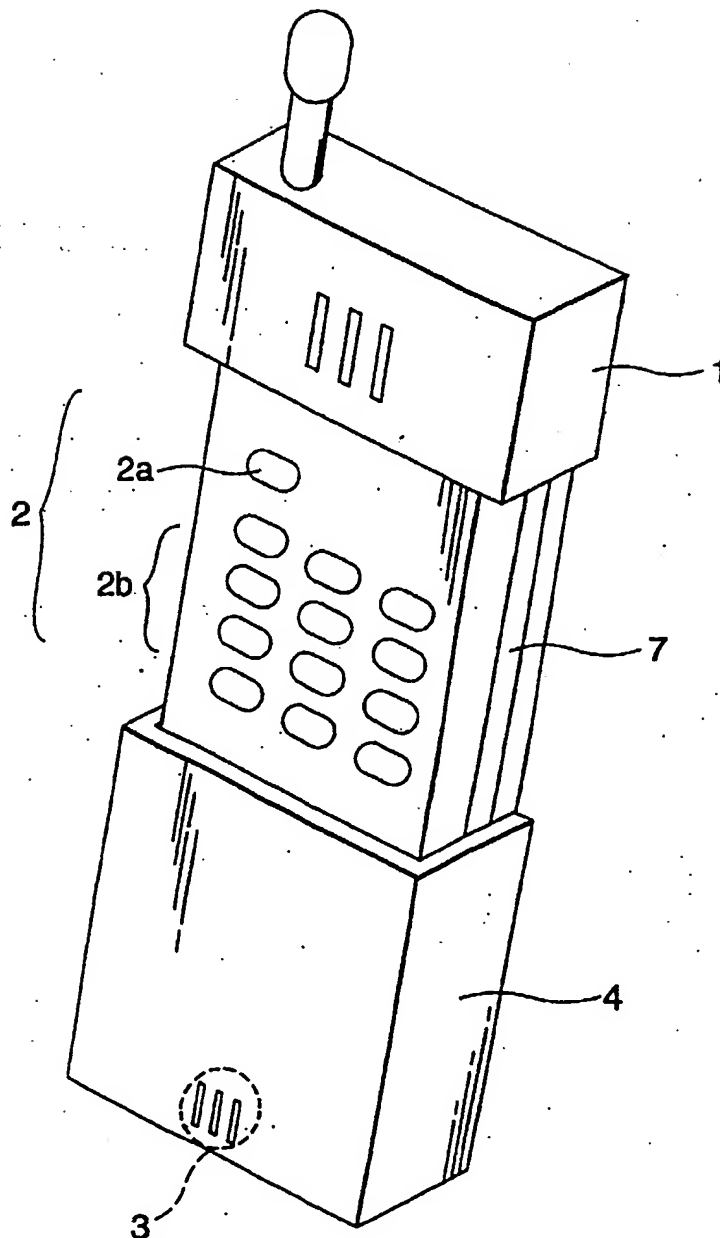


FIG.3C



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FIG. 4



PORTABLE RADIO DEVICE

The present invention relates to a portable radio device having a slidable cover, in particular, it relates to that allowing the call in the state the cover is closed.

In conventional portable radio devices, a structure for covering a key operation part using a foldable structure or a rotatable lid has been adopted for providing a small size during carriage and protection of the key operation part. Furthermore, recently, a structure for covering the key operation part by a slidable cover has also been put into the practical use.

As shown in FIG. 4, a conventional portable radio device having a slidable cover comprises a housing 1 having a key operation part 2 including a transmission starting key 2a and ten keys 2b, and a cover slidable with respect to the housing 1 according to a rail part 7 so that the cover can be moved in the state the key operation part 2 is covered or the state it is exposed. Moreover, a transmitter 3 is provided in the cover 4.

The portable radio device can be carried with a small size with the key operation part protected by closing the cover 4. In starting a transmission, by opening the cover 4 for exposing the key operation part 2, the key operation can be enabled so as to provide the transmission state. At the time, since the transmitter 3 is stored in the cover 4, it can be disposed at the mouth of the user, following the cover 4.

However, according to the conventional configuration, since the key operation part 2 is covered by the cover during carriage, the key operation cannot be enabled immediately. And thus a problem is involved in that the transmission cannot be started without the operation of opening the cover 4 particularly in the case of receiving a call.

Moreover, since the transmitter 3 stored in the cover and the device main body should be energized, a problem

arises in that the configuration is complicated and the risk of malfunction and breakage is high.

Furthermore, despite the recent trend toward a smaller size in the portable radio devices, the number of the keys is hardly reduced, and thus the size and the interval of the keys tend to be smaller. As a result, the key operation becomes difficult.

Moreover, recently, in most cases, phone numbers to be called are stored in the memory of a portable radio device so that the number to be called is retrieved from the phone list in the memory for making a call by just pressing the call button, and thus the frequency of using the ten keys for dialing is reduced. However, there are many keys in the key operation part, and as mentioned above, since the size and the interval of the keys are smaller, the risk of making a key operation mistake is high, and thus the merit of making a transmission just by operating a smaller number of keys has not been fully utilized so far.

In order to solve the conventional problems, an object of the invention is to provide a portable radio device allowing a transmission with the cover on, with little possibility of breakage or malfunction.

Furthermore, still another object is to provide a portable radio device with a small size without sacrificing the operativity.

Accordingly, in a portable radio device according to the invention, a cover for covering a key operation part, a housing comprises a transmitter part, and the cover comprises a transmitting opening at a position corresponding to the transmitting part.

Therefore, the transmission can be conveyed from the transmitting part with the cover closed.

According to the present invention, a portable radio device comprising a housing having a key operation part; a cover for covering the key operation part; a transmitter part on the housing; and a transmitting opening provided on the cover, wherein the cover is slidable between a first

end where the key operation part is covered and a second end where a part of the key operation part is exposed, and wherein the transmitting opening is formed at a position corresponding to the transmitter part when the key operation part is covered with the cover.

Since a first aspect of the invention is a portable radio device comprising a housing having a key operation part, and a slidable cover for covering the key operation part, wherein the housing comprises a transmitter part, and the cover comprises a transmitting opening at a position corresponding to the transmitting part in the state the key operation part is covered, the transmission can be enabled with the cover closed.

A second aspect of the invention is the portable radio device according to the first aspect, wherein the cover comprises a second transmitting opening at a position corresponding to the transmitting part in the state the key operation part is exposed, the cover needs not be opened until the transmitting part of the housing is exposed, and thus a small size of the device can be achieved.

Since the cover comprises a cylindrical rib surrounding at least one of the transmitting openings at the side facing to the transmitting part in a third aspect of the invention, the noise leakage of the voice being transmitted can be prevented.

Since the housing comprises a cylindrical rib surrounding the transmitting part in a fourth aspect of the invention, the noise leakage of the voice being transmitted can be prevented.

Since the housing comprises a rib to be fitted with the cylindrical rib provided in the cover, surrounding the transmitting part in a sixth aspect of the invention, the noise leakage of the voice being transmitted can be prevented.

35

Brief Description of the Drawings

FIG. 1A is a plan view of a portable radio device according to the invention in the state with a cover closed, FIG. 1B is a plan view thereof in the state with the cover opened, and FIG. 1C is a side view thereof in the state with the cover opened.

FIG. 2A is a perspective view of the cover of the portable radio device according to the invention and FIG. 2B is a rear view of the cover.

FIG. 3A is a perspective view showing a cylindrical rib provided around a transmitting opening part in the portable radio device according to the invention, FIG. 3B is a cross-sectional view showing the cylindrical rib provided around the transmitting opening part, and FIG. 3C is a plan view showing the cylindrical rib provided around the transmitting opening part in the housing.

FIG. 4 is a perspective view showing a conventional portable radio device having a slidable cover.

Hereinafter the invention will be explained with reference to the drawings.

As shown in FIGS. 1A to 1C, a portable radio device according to the present invention comprises a cover 4 slidable with respect to a housing 1. FIG. 1A is a plan view showing the state with the cover 4 closed, FIG. 1B is a plan view showing the state with the cover opened, and FIG. 1C is a side view showing the state with the cover opened.

Moreover, FIG. 2A is an exploded perspective view of the cover 4, and FIG. 2B is a rear view of the cover 4. The cover 4 is provided with key pressing parts 5 formed integrally with the cover. The key pressing parts 5 are made from an elastomer resin, which is different from a resin comprising the cover 4. According to the integral molding by a two-color molding method with the two materials, the cover 4 shown in FIGS. 2A and 2B can be produced. Numeral 4a denotes the portion of the elastomer

resin. Since border lines appear on the borders of the different materials in the two-color molding, a decoration panel 16 is fitted to the front side of the cover 4 for hiding the border lines. The decoration panel 16 is
 5 provided with holes for exposing the key pressing parts 5.

Furthermore, the cover 4 has two openings for transmission (6a, 6b in FIGS. 1A, 1B), and the decoration panel 16 is provided with holes at the positions corresponding to the openings. Numeral 8 in FIG. 2B denotes
 10 a cylindrical rib surrounding the opening.

Moreover, the cover 4 comprises a rail part to be engaged with a rail part 7 provided in the housing 1 so that the cover can slide from the state of FIG. 1A to the state of FIG. 1B.

15 Furthermore, numeral 10 in FIG. 2B denotes a locking nail for positioning the cover 4 with respect to the housing 1, and numeral 22 denotes a stopper projection part.

In contrast, as shown in FIGS. 1A and 1B, the housing
 20 1 is provided with operation keys 2 including a transmission starting key 2a, a clear key, a finish key, ten keys 2b, a memo key, and voice manner key. Further, a transmitter 3 is provided at a lower part of the housing 1.

As shown in FIG. 1A, the five pressing parts 5 of the
 25 cover 4 are disposed above the transmission starting key 2a, the clear key, the finish key, the memo key, and the voice manner key in the state with the cover 4 closed so that the user can operate these keys by pressing the pressing parts 5 with the cover 4 closed.

30 Moreover, the transmitting opening part 6a of the cover 4 is disposed above the transmitter 3 in the state with the cover 4 closed so that the user can transmit a call from the transmitter 3 with the cover 4 closed.

Therefore, even in the case the device is carried with
 35 the cover 4 closed, a call can be started by operating the pressing parts 5 of the cover so as to press the

transmission starting key 2a without the operation of opening the cover.

Furthermore, as shown in FIG. 1B, the other transmitting opening part 6b of the cover 4 is disposed
5 above the transmitter 3 in the state with the cover 4 opened so that the user can input the voice to the transmitter 3 via the transmitting opening part 6b.

Moreover, as shown in FIG. 3B (a cross-sectional view taken on the line A-A of FIG. 1A), a transmitter 3 is
10 stored inside the housing 1, and a rib 9 is formed around the opening for the transmitter 3 provided in the housing 1, surrounding the half circumference of the opening. In contrast, a cylindrical rib 8 (FIGS. 3B, 2B) is provided around the transmitting opening part 6b of the cover, with
15 the cylindrical rib 8 fitted with the rib 9. Therefore, noise leakage between the transmitting opening part 6b and the transmitter 3 can be prevented so that deterioration of the communication quality can be prevented.

According to the portable radio device, since the
20 transmitter 3 is stored in the housing 1 in this device, unlike those having a transmitter in the cover side, a simple configuration can be achieved with a less possibility of malfunction. Furthermore, the noise leakage between the transmitting opening part 6b and the
25 transmitter 3 can be prevented owing to the cylindrical rib 8 and the fitting rib 9 so that deterioration of the communication quality can be prevented.

Although the case with the cylindrical rib 8 and the rib fitted has been explained here, it is also possible to
30 provide only the cylindrical rib in either the cover 4 or the housing 1.

Furthermore, it is also possible to expose the transmitter 3 in the state with the cover 4 opened, with the cover 4 provided with only the transmitting opening
35 part 6a at a position corresponding to the transmitter 3 in the state with the cover 4 closed.

CLAIMS

1. A portable radio device comprising:
a housing having a key operation part;
5 a cover for covering the key operation part;
a transmitting part provided on the housing; and
a transmitting opening provided on the cover;
wherein the cover is slidable between a first end
where the key operation part is covered and a second end
10 where a part of the key operation part is exposed, and
wherein the transmitting opening is formed at a
position corresponding to the transmitting part when the
key operation part is covered with the cover.
2. The portable radio device according to claim 1
15 wherein the cover further comprises a second transmitting
opening, wherein respective transmitting openings are
positioned to correspond to the transmitting part when the
cover is located at the first and second ends respectively.
3. The portable radio device according to claim 2,
20 wherein the cover further comprises a first rib formed
around the transmitting opening on the side of the cover
facing the transmitting part.
4. The portable radio device according to claim 3,
wherein the housing comprises a second rib which fits with
25 the first rib provided on the cover.
5. The portable radio device according to any one of
claims 1 to 4, wherein the housing comprises a third rib
formed around the transmitting part.
6. The portable radio device according to claim 5,
30 wherein the third rib has a cylindrical shape surrounding
the transmitting part.
7. A portable radio device comprising:
a housing having a key operation part;
a slide cover for covering the key operation part;
35 a transmitting part provided on the housing;
a transmitting opening provided in the slide cover;
and

a first rib provided on the slide cover on the side of the slide cover facing the transmitting part at a position corresponding to the transmitting opening.

8. The portable radio device according to any one of
5 claims 1 to 7, wherein a surface of the transmitting part is inclined towards a bottom face of the housing.

9. The portable radio device according to any one of
claims 1 to 8, wherein the transmitting part includes a
transmitter provided in the housing and a second
10 transmitting opening provided in the cover, and

wherein the transmitting opening has a larger area than the second transmitting opening.

10. The portable radio device according to any one of
claims 3 to 9, wherein the first rib has a cylindrical
15 shape surrounding the transmitting opening or the second transmitting opening.

11. The portable radio device according to any one of
claims 3 to 10, wherein two first ribs are provided, one
first rib surrounding each of the transmitter opening and
20 the second transmitter opening.

12. A portable radio device according to claim 1,
substantially as described with reference to Figures 1 to
4 of the accompanying drawings.



INVESTOR IN PEOPLE

Application No: GB 0309965.2
Claims searched: 1-6,8-12

Examiner: Stephen Jennings
Date of search: 20 May 2003

Patents Act 1977 : Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
A		GB 2235850 A (Plessey)
A		WO 99/12322 A1 (Ericsson)

Categories:

X Document indicating lack of novelty or inventive step	A Document indicating technological background and/or state of the art.
Y Document indicating lack of inventive step if combined with one or more other documents of same category.	P Document published on or after the declared priority date but before the filing date of this invention.
& Member of the same patent family	E Patent document published on or after, but with priority date earlier than, the filing date of this application.

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Worldwide search of patent documents classified in the following areas of the IPC⁷ :

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WPI, EPODOC, JAPIO